

Bibliography of SSBs, Caries, etc.

SSBs and Dental Caries – Causative Mechanisms

Methods: International Caries Detection and Assessment System (ICDAS) used to evaluate caries among children in rural villages in Mexico, and risk factors were assessed via questionnaires

Conclusions: Caries prevalence was between 94.7%-100% in children studied. Mean number of surfaces with lesions per child were 15.4-26.6, and many children reported drinking sugary beverages. This is a good starting publication for exploring oral health and SSBs in Mexico.

Citation: Guido JA, Martinez mier EA, Soto A, et al. Caries prevalence and its association with brushing habits, water availability, and the intake of sugared beverages. *Int J Paediatr Dent.* 2011;21(6):432-40.

Methods: Case study

Conclusions: Dental caries is an infectious disease involving all age groups. Adolescence is a period in which the risk for dental caries remains especially high. Many factors, some unique to the teenage years, contribute to the initiation and progression of dental caries in this age group. One factor with the potential for being significant is the adolescent diet, especially the high consumption of sugars. One product that tends to contribute to the amount of sugar ingested is carbonated beverages. Many soft drinks also contain significant amounts of caffeine. Regular caffeine ingestion may lead to increased, even habitual, usage. It is suggested that the combination of the consumption of highly sweetened soft drinks and habitual usage of caffeine may significantly increase a susceptible adolescent's potential for developing dental caries. Cases are presented demonstrating the early initiation and rapid progression of dental caries in three adolescents. A common factor is the ingestion of high amounts of caffeinated-carbonated soft drinks.

Citation: Majewski RF. Dental caries in adolescents associated with caffeinated carbonated beverages. *Pediatr Dent.* 2001;23(3):198-203.

Methods: Cross-sectional study

Conclusions: This is the seminal paper on sugary drinks and dental caries. The cariogenicity of soft drinks was evaluated in 3,194 Americans aged 9 to 29 years who were examined during the NHANES I survey conducted from 1971 to 1974. A significant positive association was found between the frequencies of at- and between-meal consumption of soft drinks and high DMFT scores. These associations remained even after accounting for the reported concurrent consumption of other sugary foods and other confounding variables. The results of this study underscore the need for further evaluation of the relation between adhesiveness of sugary foods and dental caries and more research of the cariogenicity (or lack of it) of diet drinks. "Pure cariogenicity" is suggested as a term to apply to gram-for-gram comparisons, whereas "effective cariogenicity" also considers amount and frequency of consumption. Dentists and

auxiliaries, in their dental health education, should not imply that sugary solutions are less cariogenic than sticky snacks, for there may be no difference in effective cariogenicity in modern American society.

Citation: [Ismail AI](#), [Burt BA](#), [Eklund SA](#). The cariogenicity of soft drinks in the United States. [J Am Dent Assoc](#). 1984 Aug;109(2):241-5.

Methods: Systematic Literature Review

Conclusions: With consistent access to fluoride, it seems like sugar may play a lesser role in the development of caries.

Citation: [Burt BA](#)¹, [Pai S](#). Sugar consumption and caries risk: a systematic review. [J Dent Educ](#). 2001 Oct;65(10):1017-23.

Epidemiological Data: Mexico

Methods: Cross-sectional study

Conclusions: The variables that had the most significant effect on the DMFT (decayed, missing, filled-in teeth) score were proportion of paved roads between the community and dental services, and the availability of piped potable water. The DMFT score increased in proportion to the percentage of paved roads. In contrast, the DMFT score decreased with the availability of piped potable water. Similar results were found for untreated tooth decay. The main variable associated with a significant increase in dental fillings was proportion of paved roads.

- Paved roads = more access to unhealthy foods?
- Potable water = less need for drinking SSBs

Citation: [Gerardo Maupome](#)¹; [E. Angeles Martínez-Mier](#)¹; [Alanna Holt](#)¹; [Carlo Eduardo Medina-Solís](#)¹; [Andrés Mantilla-Rodríguez](#)¹; [Brittany Carlton](#)¹. Caries dental moderada por variables geográficas espaciales en un medio rural en México. [Cad. Saúde Pública](#) vol.29 no.7 Rio de Janeiro July 2013

Obesity and Dental Caries

More studies needed relating obesity and dental caries

Methods: Literature review

Conclusion: No systematic review has focused on correlating obesity and caries and only three studies had high levels of evidence. Only one study with high level of evidence showed direct association between obesity and dental caries. In view of the findings, further well-designed randomised studies are needed to demonstrate the relationship between dental caries and obesity.

Citation: [Kantovitz KR](#)¹, [Pascon FM](#), [Rontani RM](#), [Gavião MB](#). **Obesity and dental caries-- A systematic review.** [Oral Health Prev Dent](#). 2006;4(2):137-44.

Longitudinal Study of tooth eruption, dental caries, & obesity in Mexican Schoolchildren

Methods: 4-year longitudinal study of 88 Mexican schoolchildren in a middle-income area of Mexico City. Looked at dmft (primary teeth), DMFT (permanent teeth) and BMI.

Conclusion: Overweight children (higher BMI) had more erupted teeth and a lower caries index.

Citation: Sánchez-pérez L, Irigoyen ME, Zepeda M. Dental caries, tooth eruption timing and obesity: a longitudinal study in a group of Mexican schoolchildren. *Acta Odontol Scand.* 2010;68(1):57-64.

Cohort study of obesity and caries in Indian children

Methods: Data from a cohort of 1,550 children. Recorded DMFT, dmft, and BMI of children.

Conclusion: Showed a significant association between overweight children ($P < 0.001$), obese children ($P < 0.05$) and caries prevalence.

Citation: Basha Sakeenabia /Hiremath Shivalinga Swamyb /Roshan Noor Mohammedc. Association Between Obesity, Dental Caries and Socioeconomic Status in 6- and 13-year-old School Children. *Oral Health Prev Dent* 2012;10: 231-241

Dental Caries and Malnutrition

Dental caries affects body weight, growth and quality of life in pre-school children

Methods: Literature review

Conclusion: Over 90% of caries is untreated and toothache is common in many countries. Untreated dental caries with associated discomfort or toothache contributes to weight gain, growth and quality of life as well as the cognitive development of young children. A review of the possible effects of dental caries on failure to thrive (FTT) showed that in otherwise healthy children, severe dental decay could contribute to FTT. Further evidence of the effect of dental caries on growth comes from studies of 'catch-up growth' following comprehensive dental treatment, which indicated that the previous oral condition compromised nutritional intake. Mechanisms by which dental caries *may be* associated with underweight/poor growth in children (more research needed):

- First, untreated caries and associated infection can cause pain and discomfort and reduce intake of foods because eating is painful.
- Second, severe caries can affect children's quality of life and thereby growth. Impacts include pain, irritability and disturbed sleeping habits.
- A third possible mechanism of how untreated severe caries with pulpitis affects growth is that chronic inflammation from pulpitis and chronic dental abscesses affects growth via chronic inflammation affecting metabolic pathways where cytokines affect erythropoiesis. For example, interleukin-1 (IL-1), which has a wide variety of actions in inflammation, can induce inhibition of erythropoiesis.

This suppression of haemoglobin can lead to anaemia of chronic disease as a result of depressed erythrocyte production in the bone marrow.

Citation: Sheiham A. Dental caries affects body weight, growth and quality of life in pre-school children. Br Dent J. 2006;201(10):625-6.

Untreated severe dental decay and low BMI in Filipino children

Methods: Cross-sectional study of 1951 11-13-year-old children.

Conclusions: Caries prevalence was 82% and odontogenic infections due to caries was 55%. Children with odontogenic infections (PUFA + pufa > 0) as compared to those without odontogenic infections had an increased risk of a below normal BMI (OR: 1.47; 95% CI: 1.19-1.80).

- There is a significant association between caries and BMI and particularly between odontogenic infections and below normal BMI.

Citation: Benzian H, Monse B, Heinrich-weltzien R, Hobdell M, Mulder J, Van palenstein helderman W. Untreated severe dental decay: a neglected determinant of low Body Mass Index in 12-year-old Filipino children. BMC Public Health. 2011;11:558.

SSBs and Other Health Consequences

Asthma

Methods: Cross-sectional study

Conclusions: 10.8% of students grades 9-12 had asthma. Compared with those who did not drink regular soda, odds of having current asthma were higher among students who drank regular soda 2x per day (OR = 1.28, 95% CI 1.02-1.62) and 3+ times per day (OR = 1.64, 95% CI 1.25-2.16). Need more longitudinal examination.

-There is strong evidence building that SSB consumption is correlated with asthma in children and adolescents, but this is a correlation only - the causative pathway is not yet known

-There is conflicting evidence that sugar alone is associated with hyperactivity in children, but consumption of *caffeinated* SSBs is associated with hyperactivity and inattention, and caffeine may reinforce a taste preference for sugary foods.

Citation: Park S, Blanck HM, Sherry B, Jones SE, Pan L. Regular-soda intake independent of weight status is associated with asthma among US high school students. J Acad Nutr Diet. 2013;113(1):106-11.